

Sustainable Woods Cooperative - Spring Green, WI 53588

Department of Agriculture, Trade and Consumer Protection
Division of Marketing
Agricultural Development & Diversification Program (ADD)

1998 Grant Project Final Report

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Grant Project Title: Sustainable Woods Cooperative

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City, State and Zip Code: Spring Green, WI 53588

Submitted by: Jim Birkemeier Date: August 6, 1999

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1) Describe the original intent of the grant project.

Sustainable Woods Cooperative was formed by a group of woodlot owners to manage their forest resources in a future-oriented and environmentally responsible manner. SWC will allow careful harvesting of small amounts of timber on a regular basis to provide a steady income to the owner. Processing of the wood into value-added products greatly increases the net income of the owner, creates many new jobs in the local community, and encourages the forest owner to be involved directly in the management of the timber. Membership in SWC allows a forest owner to control their resource and avoid the many common pitfalls of marketing timber through traditional methods that have greatly discouraged long term forest management on private woodlots.

- How was it projected to benefit Wisconsin Agriculture?

Timber is the most common crop on Wisconsin farms, yet is in most cases is not being managed wisely or marketed effectively from the owner's point of view. SWC is working to educate the landowner and provide them tools for improving the management of this neglected crop. A managed stand of oak timber can now produce over \$100/acre per year (~1 in stumpage value), yet most owners are unaware of the potential or how to attain it. Selling flooring, millwork, lumber etc. allows the owner to receive about double the income of selling trees or logs through conventional markets.

- Was it necessary to adjust the objectives during the project?

The complexities of a fully integrated wood harvesting and processing system extended the planning processes this past year. No major stumbling blocks were encountered, things just turned out to be slower to develop than anticipated.

2) Describe the work conducted in this project. How did the grant funds assist you in this project?

This grant provided funds for the people doing the planning and development of the SWC. This is the first forestry cooperative that we have heard of that developed the vertically integrated value-added processing, and direct marketing of "Green Certified" lumber products. Our planning has included, sustainable forest management, environmental protection & restoration, low-impact logging systems, thin-kerf band sawmill technology, material handling systems, solar kiln drying, manufacturing high value products from low quality trees, and direct marketing systems. All of this research and development has been aided tremendously by the ADD grant.

- What successes did you achieve with this grant project?

Our "Full Vigor Forest Management" System is completed and is now the basis for our sustainable management plans. This common sense approach to timber growth is being well received by our members.

We now have a well-rounded Business Plan and a start-up plan to begin operations at a new site in Lone Rock. Our offer to purchase 4.5 acres in a new industrial park has been accepted and we are working out the legal steps for purchase.

Our trial run harvests are bringing excellent prices for kiln dry lumber sales, giving real numbers to supplement the projections of the business plan.

Mailings will be sent out soon for our membership equity drive to begin.

Our cooperative has received national attention as an example for others to follow.

- What challenges did you face with your grant project?

The timber industry is very traditional and well entrenched. Our approach is very different and is changing many aspects of management, harvesting, processing and marketing. Industry representatives, government foresters, and even many of our own members have been slow to understand the changes we are making. Getting the whole story out is important to avoid bad first impressions from hearsay.

3) Describe the public outreach efforts of this project.

- What literature or educational materials were produced through this project?

Balancing Forest Ecology and Economics - Business Plan for the Sustainable Woods Cooperative
- developed by Cooperative Development Services
Full-Vigor Forest Management - developed by Timbergreen Forestry.
Much of this information has been made available on the internet.

- What presentations, field days or other events were given related to this project?

Several specific tours and informational meetings were held for our members.
Monthly Forest Owner Field Days have been held at Timbergreen Farm to demonstrate all aspects of the SWC system
People from Ohio, Iowa, Indiana, Minnesota, and Illinois (Wisconsin too) have attended this year. Tours were given to dozens of groups and individuals from as far away as Finland and Kenya. Jim Birkemeier and Gigi La Budde made presentations this past year at conferences in Oregon, Alabama, Maine, Vermont, Massachusetts (twice), and Ohio (Wisconsin too) on the cooperative.

- What media outreach did you conduct through this project? Please identify specific papers or stations.

Television - all Madison stations have featured SWC and several of the stories were carried state-wide.
Radio. Public radio has had numerous stories as well as WTDY in Madison
Magazines: Independent Sawmill and Woodlot Magazine in Maine and Northern Logger in New York did feature stories. A national Coop magazine also.
Newspapers: Farm Bureau's news, and many local papers including Spring Green, Dodgeville, LaCrosse, Hayward.

4) Describe the results of this project.

- Did the grant project results meet your original expectations? Why or why not?

All aspects of the system are looking good. The trial run harvests, for 7 of our members at Timbergreen Farm, are producing ten times the value for the kiln dry lumber and flooring, compared to the traditional market value of the logs. Despite our small-scale inefficiency and experimental efforts - these forest owners are receiving a net income of about double the normal stump age value. These harvests have been strictly improvement harvests - removing only the

worst trees first and leaving all the good timber with more room to grow for the future. No commercial logger or sawmill will perform the improvement cuts that we mark - they want just the good trees.

- What new agricultural products, technologies or production methods were developed through this project?

Sustained yield harvests on small woodlots
Low-impact harvesting systems to protect the future crop of timber
Modular sawmill systems to build coop processing yards as needed
Solar Cycle Kilns on a commercial scale

- What did you learn from your grant project? What conclusions can you make? We are on the right track and need to continue to develop our system.

Each aspect of the system was improved as we shared ideas with people from around the country and world. The Business Plan showed that the cooperative is feasible and should begin to show a profit in the third year.

- How will the grant results affect your business?

This grant will allow SWC to begin operations much sooner and with a better developed start up program than if we had been on our own for planning. We have better information to share with other interested groups. We have already shared our Business Plan with a similar group in the Northeast - Vermont Family Forests. Both groups have benefited from this exchange of ideas and inspiration.

- How will this project benefit the Wisconsin family farm?

We can now demonstrate that timber is a profitable crop to manage - even in a small farm woodlot.
We can now demonstrate that a sustainable harvest schedule has a higher present net value and many other positive values than a one time large commercial harvest.
We can now demonstrate that value-added processing and direct marketing of wood products will greatly increase the income to the woodlot owner.

- What impact will this grant project have on the future of Wisconsin agriculture?

More farms own timber than any other crop. This should encourage farmers to manage their timber for maximum income and market it for the best value possible.

- 5) How will the Wisconsin agriculture industry be able to use the information from this project?

We hope that our cooperatives can be an example for others to follow. The Community Forestry Resource Center and the Sustainable Woods Alliance will make all our information available to forest owners. Our goal is to teach common sense, practical and profitable forest management techniques. We will work to further develop our demonstration field days and successful examples of profitable forest management.

- 6) Include any research data that support your conclusions for this project.

- 7) Include any other information you feel is appropriate. (Examples: Samples of educational materials produced through this project

Full Vigor Forest Management is included

Clippings and/or audio/video tapes - We have a whole pile of newspaper clippings if you need some.

- What other research should be done to further this enterprise or activity?

Market research will be a continuous process.

- Can an industry leader make a statement as to the value of this grant project?, etc.)

Tom Brendler, Boston Mass. National Network of Forest Practitioners, recently told me over the phone, "The whole nation is depending on you to make your cooperative successful. You are leading the way for all of us."

ADD has been a pleasure to work with! We have received outstanding cooperation and support from Mike Bandli. All aspects of this program have been positive and rewarding!! Thank You!

Timbergreen Forestry - Full Vigor Management Summary July 20, 1999

The goal of the "Full-Vigor" management system is to produce vigorous stands of high quality trees that fully utilize the available resources at each spot in the forest. The quality & quantity of wood produced and the natural diversity of the trees in the forest will be constantly improved. Individual trees will normally be grown as long as they are sound and vigorous. Natural regeneration, succession, and disturbance will be anticipated and incorporated into management systems.

Trees are managed by looking at each individual - "on the spot" where they live - and working to maximize the many benefits available from that tree. As individual trees are managed in relation with their neighbors, gradually the whole forest is treated for exactly what is most beneficial to the owner and the future of the forest.

Trees growing vigorously are desirable for many reasons including; timber production, forest health, and forest owner involvement. Diameter growth should be maintained at 1/4" to 1/2" per year on most important trees. Tree quality, diameter growth, crown characteristics, and stem spacing are important factors in management decisions. The 1/3, 1/3 Principle and The FVM Spacing Guide are useful tools in the field.

An average woodlot can produce a harvest every year, creating a regular income. Harvests will be carried out in convenient management units called "working areas". Harvesting will normally start by removing the "worst first". A gradual harvest beginning with worst first allows us to learn about each area of the forest by "Reading the Stumps". Knowing the history of each area, monitoring growth rates, and noticing patterns in defects, helps to make future oriented decisions to keep the important trees healthy and vigorous. On good growing sites, thinning in a specific working area should take place every 1-5 years. A 5-10 year harvest cycle will be used for lower quality sites.

Minimum-impact logging creates a very small disturbance with an immediate return to full production. The preferred method of harvesting will be a short skid to a trail using a -horse team or cable system, then pre-hauling to the road. Harvesting is accomplished with the precision of "Arthroscopic surgery".

The Desired Future Condition is the most productive, healthy, valuable forest possible from each area of the forest. Specific objectives will be covered by area if necessary. The "Full - Vigor" forest produces optimum income for the owner while providing other high quality benefits - including wildlife habitat, clean water, aesthetics and recreation.

Nearly all forests in the region have been degraded by shortsighted management. The Restoration Harvest System is the first step in rebuilding a degraded forest. It may then take decades utilizing the Improvement Harvest System to return a high-graded woodlot to full production. Once a forest reaches full stocking of high quality trees, a Maintenance Harvest System will be adopted for long-term management.

Full-Vigor Management Systems:

- **Timber Stand Improvement:** Pre-commercial cutting, or combined with a harvest thinning, weeding, site preparation, crop tree release, pruning.
- **Restoration Harvest:** eliminate trees with poor future potential commercial weeding, thinning, site prep for regeneration this first pass through the area may be a major treatment if land is highly degraded. worst - first, salvage, develop existing opportunities, and TSI
- **Improvement Harvest:** improve spacing of important trees regular removal of small amounts of wood to gradually improve timber worst - first, salvage, and TSI
- **Maintenance Harvest:** improve spacing for vigor and value growth harvest the natural production of the forest on a 1-10 year schedule encourage natural regeneration, succession, and diversity (do not allow the market to influence the harvest)
- **Regeneration Harvest:** Maturing stand with inadequate regeneration (reduce the excessive deer and turkey populations) patch cutting to regenerate shade intolerant species
- **Tree planting:** to establish new forests or regenerate poorly stocked forest direct seeding of selected seeds by hand, or traditional methods

D-trees: Put your timber on a Diet!

Trees require a certain amount of light, water and nutrients just to live. if trees are overcrowded, they struggle just to produce leaves, seed, and to survive each year. For a tree to grow vigorously - extra light, water, and soil nutrients are needed. Think of these factors as the number of "calories" in your tree's daily diet. By monitoring a tree's diameter growth, we can easily tell how well it is "eating".

The simplest and most accurate method of determining optimum stocking levels in a forest is to monitor the diameter growth of the important trees. These are the individuals of all sizes and species that have good future potential A sample of D-trees (Diameter-trees) will be marked and measured to monitor the diameter growth of the forest. Dominant high value trees as well as representative individuals of various sizes should be measured. -A permanent mark at 4.5 ft from the ground is needed to assure accurate re-measurement. One D-tree per 5 acres, with a minimum of 10 trees - and a maximum of 100, will be chosen to monitor a woodlot. Ideally at least 5 D-trees per working area should be measured. A random selection is best, but convenient locations near trails will make the system more efficient. Careful mapping and/or GPS coordinates are important for larger properties. D-trees will be marked with paint or tags and measured with a diameter tape.

Growth data, correlated with the bark characteristics of trees in each working area will be used to guide management decisions over the years. Examining stumps of trees cut for TSI or harvest also gives valuable information on the history of the stand and current timber growth rates. Stands will be managed to encourage important crop trees to maintain optimum diameter growth rates.

Forest Stocking Levels – a continuum across the landscape:

- **Under-stocked:** If an area is under-stocked, the trees are widely spaced and open grown, diameter growth should be vigorous, but tree quality will be relatively low and much opportunity for timber production will be lost.
- **Fully-stocked:** In a fully stocked area, the important trees are well spaced and growing vigorously, production is high, and little harvesting is recommended. Our goal is for most important trees to grow in diameter between 1/4" and 1/2" per year.
- **Over-stocked:** If the growth of the dominant trees is less than 1/4" per year, the area is overcrowded, and many trees will be literally starving to death. Our goal is to thin the stand, taking the worst first, until important trees have enough room to grow with vigor.

Landowner Goals for their land:

This list of common ownership goals is generally accepted by forest owners, but additional goals may be added for each area of the property.

- 1) Develop the working areas of the forest resource into diverse, fully stocked stands of high quality timber that are appropriate to the land, to support sustained yield harvesting throughout the future by:
 - increasing and protecting the natural diversity of the forest while allowing natural succession to proceed, and
 - restoring forest habitats and communities degraded by shortsighted harvesting, grazing and burning.
- 2) Protect, restore, and develop natural communities, unique ecosystems, and habitat types in Natural Areas by:
 - encouraging native animal life and vegetation of all sizes to flourish in each habitat type, and
 - restoring natural habitats and communities that have been degraded by shortsighted harvesting and grazing.
- 3) Establish and maintain a system of well designed and constructed woods roads and trails for continued access to all stands for forestry work as well as recreational use.
- 4) Produce regular income for the forest owners throughout the future.
- 5) Balance maintaining natural habitats to produce a healthy population of many types of wildlife, with limiting excessive animal damage to natural regeneration of plant species.

Factors affecting individual tree management decisions include:

- 1) Present quality and future potential of the valuable lower trunk.
 - What is the Risk of growing this tree until the next harvest cycle?
- 2) Individual tree vigor - diameter growth,
- 3) Quality of the tree's crown (width, depth, position, health, etc)- -
- 4) Tree Species. Species priority will vary from stand to stand depending on relative timber values as well as the desirability of the species in the future fully stocked stand.
 - a) First Priority Species: climax species to produce a seed source
 - i) Sugar Maple, Ash, and Basswood on mesic sites
 - ii) White Pine and Red Maple on dry sites
 - iii) Shade tolerant species
 - b) Second Priority: high value species Walnut, White Oak, Cherry, Red Oak
 - c) Third Priority: intermediate value species Aspen, red maple, hickory,
 - d) Fourth Priority: any sound tree (the general trend is that every-sound tree will be valuable in the future).

Tree Spacing -The 1/3, 1/3, 1/3 Principle:

Take the total tree height, divide by three - the average spacing of important trees should be about 1/3 of their total height. An individual tree's crown width should be about 1/3 of their total height. A tree's crown depth should be about 1/3 of their total height. This system quickly illustrates if thinning is needed. In regions with tall conifer timber, 1/4 of total tree height may be a more appropriate ratio.

Insects and Disease:

Insect and disease problems will be monitored and dealt with as the need arises. Prompt salvage of oak wilt trees and other mortality will be made when possible. Large vigorous trees are more resistant to defoliation by Gypsy Moth and other insects. Maple and ash are two of the less favorite targets of the gypsy moth, while red oak is a favored food. A natural variety of vigorous healthy trees will be maintained to minimize risk of catastrophic loss due to pests or storms. Annual management will assist in monitoring.

Timber Growth Estimates:

The US Forest Service and Wisconsin DNR take a regular inventory of the timber resource in Wisconsin. The latest data estimates an average stocking in our region of 3500 board feet per acre, with annual growth of 110 board feet/acre of sawtimber or 186 board feet/acre of total growing stock. Our experience is that these are reasonable numbers and can be used as an effective reference for estimating stocking and growth on individual woodlots. Timber management is done based on the Risk & Vigor of individual trees, and the other factors described in this summary.

Timber Harvest Schedule:

- 1) **Restoration Harvest** - Initial harvest in new working area
 - a) Harvest dead, dying, diseased, deformed, damaged, and defective trees (trees that will not ever be future crop trees)
 - b) Thin overcrowded groups of good trees (work on proper spacing).
 - c) Release crop trees from competition of lower value trees.
 - d) Perform non-commercial TSI during harvest work
 - i) weeding - including vine removal from crop trees and invading exotics
 - ii) thinning, crop tree release, site preparation, pruning
 - e) stocking may be reduced below desired levels in this first harvest to alter timber type,
 - i) eliminate undesirable species, or promote regeneration.
 - ii) (BA after this cutting: 75-90 sq.ft./acre)
- 2) **Improvement Harvest**
 - a) Regular light improvement harvests on a 1-10 year cycle
 - b) Productive sites will be harvested more frequently than dry sites.
 - c) Cut less than annual growth to build up the forest to full stocking
 - d) Always harvest the worst trees first. Work to improve spacing of crop trees
 - e) Continue TSI work Harvest some better trees if necessary to fluid TSI work
 - f) In general, several (2-5) cutting cycles will be needed to develop full stocking for most forests that have been high-graded in the past.
 - g) Low-impact logging will allow more frequent harvests of less volume per acre.
 - h) (BA after each cutting - 90 to 140 sq.ft./acre)

3) Maintenance Harvest

- a) Sustained yield harvest of the natural production of fully stocked stands
- b) Periodically harvest 80-90% of the annual growth, removing low value trees first.
- c) Selective harvesting using low impact - low damage - high utilization logging.
- d) Harvests may be adjusted slightly to owner's needs and market changes.
- e) Plan harvests to maximize the quantity and the quality of timber growth while increasing the natural diversity of the forest.
- f) Residual stand volume 2,000 bft to 10,000 b.f. / acre depending on stand conditions
- g) (BA of stand - 100 to 180 sq.ft./acre)

Economic Considerations - Year 2000

Quickly rising timber values, caused by the shrinking supply of good quality timber available for harvest, now makes nearly any sound tree a valuable investment for the forest owner. Maturity is now extended far beyond traditional definitions of age and or size. At this time, if selling stumpage, the only truly mature tree is a dead tree, one that will not survive until the next harvest, a decaying tree, or a poor quality tree that is hindering the growth of a more valuable crop tree.

Stump age prices rising faster than the rate of inflation and the prime interest rate combined, encourages us to be very conservative in cutting high quality timber. While this stumpage price trend continues - forest owners may choose to maintain stocking levels of valuable trees at higher levels than where optimum crop tree growth will occur - as long as the future health and productivity of the forest is not jeopardized.

SWC will change the economics of forest management for its members: instead of selling stump age, landowners will now market certified value-added retail products. The value of a member's standing trees takes an instant jump to a higher level (approximately double) when switching to value-added marketing. As products are chosen and markets developed, we will research and project price increases for retail products - to provide a new understanding of timber economic maturity.

Harvest Operations:

Team approach to harvest management:

Owner, Forester, Logger. Timber will be marked by forester and team.

Loggers will be informed of management plan and the value of the residual stand.

Incentives are present to invest in the future value of the timber

Road and trail layout, construction, and maintenance will follow State BMPs.

Use of Road system

minimize off road driving with heavy machinery

minimize rutting - no skidding when soil is wet

leave road passable when finished - cut trees in road

use bumper trees on downhill side - cut last or leave high stump

pre-haul where possible to minimize soil disturbance.

Directional felling - minimize turning logs in woods

Maximum log length in skid - 34 feet unless specified

long logs are cut in half before skidding

short skid to trail, then pre-haul to road minimizes disturbance

Protection of residual crop trees and regeneration - top priority

felling - don't cut tree if a better tree will be damaged.

skidding - be creative with winch cable.

Slash management - a few extra cuts to lower slash near ground

Log Landings - minimize impact to soil and trees.

clear when finished for seeding and mowing

TSI may be accomplished during the harvest to cut all marked trees, exotics, vines, culls, weeds
(a \$/acre for each stand will be set beforehand)

Seasonal Factors - avoid working in high quality stands during growing season.

skidding and felling in summer will be done with forester supervision

break-up time work limited to firm ground.

Logger training and use of safety equipment is required for all workers.

Proper maintenance for machinery and control of waste products

Forest Regeneration:

Deer browsing on seedlings and deer & turkey foraging for acorns make any oak, or other species, regeneration effort doubtful in this region - turning most regeneration work into subsidized deer food. Animal populations must greatly be reduced before meaningful regeneration work can be attempted. German forest managers allow only about one deer per square mile to protect their forests and encourage regeneration.

Full Vigor Management - Regeneration:

We delay regeneration for decades when growing large trees. The future forest is dependent on what seed sources are available to each stand. Desirable shade tolerant seed sources (maple, ash, basswood, etc.) are gradually spreading across much of the region, making better opportunities for natural regeneration as time goes on. Natural succession of the forest to shade tolerant species is an unavoidable force over time. Undesirable seed sources (box elder, ironwood etc.) are actively discouraged during restoration and improvement harvests. By the time most of our forests reach full stocking of good quality large trees, the regeneration factors in our woods will be very different from today. . We will work to develop and protect a desirable source of seed fi)r natural regeneration.

Low-grade harvests encourage natural regeneration to establish. The stirring of the forest floor and opening up parts of the canopy, allows additional light to reach the ground. Once regeneration is well established, choices can be made concerning the best mix of crop trees for future harvests. Invading and undesirable species makes regular TSI necessary to nurture desirable natural regeneration as it develops into crop trees for the future. Increased demand for timber now makes nearly every species a viable crop tree.

Another option for regeneration is planting. We will always consider this option as an alternative, and will implement necessary measures to encourage success for each project.

Managing for Oak:

If an owner chooses to encourage oak timber (or other Shade-intolerant species), intensive management work can attempt to maintain an oak forest. Traditional oak management is well documented.

If no advance regeneration of desirable species occurs in an oak stand when large crop trees mature, it may be necessary to do patch cutting to encourage regeneration of existing species. As a stand approaches 20~30 twenty-four inch diameter and larger trees per acre, regeneration will need to be evaluated. 200~400 vigorous seedlings per acre will be sufficient to perpetuate the stand. If inadequate seedlings and saplings are not present to perpetuate the stand, an allowable harvest using a two or three acre patch cutting or shelterwood, scheduled for specific years, may be utilized. Tree seeds or seedlings may be planted (with appropriate measures to control competing vegetation) if necessary to assure 300 - 600 seedlings per acre of desirable species to form the basis for another crop.

Specialty Products

The emerging agroforestry practice of "farming the forest"-- the intentional production of valuable specialty products- can increase and broaden income, while diversifying farms and landscapes. Specialty products such as botanicals and medicinals, decorative and handicraft products, and food products such as maple syrup, mushrooms, nuts, and wild game provide new opportunities for rural development while protecting soil, water, and native species bio-diversity.

Wildlife trees and snags:

A healthy, diverse, fully stocked stand of timber offers many benefits to wildlife. Natural habitats such as prairie remnants and oak savanna that offer food and shelter for rare and endangered species are areas that require special attention. Efforts will be made wherever possible to develop these resources. Additional habitat creation for deer and turkeys that increases feeding on acorns and browsing of desirable regeneration, is often counterproductive to forestry efforts. Wildlife population control through hunting is essential for long term forest management in this region. Leasing of unused hunting land can provide income for the owner as well as help control turkey and deer populations.

Legacy trees, den trees, coarse woody debris, nesting cavities, food and cover species etc. will be maintained for their many benefits. Where practical, several wildlife trees per acre will be encouraged. Standing dead snags may present a serious hazard to woods workers, horse loggers and forest owners who spend a lot of time in their woods. Creating additional snags (other than natural occurring dead trees) must be done with extreme caution to minimize risks to forest visitors and workers. Aspen snags and girdled trees are especially dangerous.

Roads and Trails:

Develop a system of woods roads to access all areas as work progresses. Efficient skidding and pre-hauling of timber with minimal impact is important. BMPs will be used in planning and maintaining the roads over the years. Protecting the soils in the forest and on the roads is very important. Sustainable harvests of small amounts of timber will minimize soil erosion and disturbance. Roads and trails are very valuable for wildlife, producing specialty products and recreational uses of forest owners.

Monitoring and evaluation

Periodic and regular evaluation methods will be employed to assess the success of ongoing management practices. Monitoring procedures will be appropriate to site, property size, and the intensity of management.

Quantitative and Qualitative Assessment:

1. Post harvest inspection by staff forest owner, and logger:
 - Quality of logging, logging impacts, extent of utilization, appearance of property
 - Assess the need for follow up work in harvest area.
 - Discuss next year's harvest project.
 - Evaluate landowner satisfaction and involvement with management work.

2. Annual inspection by staff and or owner:

- Monitor mortality, forest health, security, pests, invasives, erosion
- Check for exotic species (occurrence, spread, long-term effects, control methods),
- Annual moving of trails will allow for regular inspection
- Evaluate forest owner's satisfaction and involvement with management work.

3. 5 year update by staff and owner:

- Assess regeneration in identified stands,
- Monitor crop tree growth (re-measurement of selected D-trees)
- Review stand composition and sustainability of ongoing management,
- Assess bio-diversity and habitat protection,
- Examine outcomes of prairie and savanna restoration activities,
- Evaluate the effects of fire on oak woodlands,
- Check species diversity as affected by harvesting practices,
- Monitor the impact of horses on woodlands,
- Review and update management plan
- Evaluate forest owner's satisfaction and involvement with management work.